

Microgravity: Always A Bad Hair Day

Gravity At Work

Lesson 1 of 2

Grade Level: K-4

Subjects: Physical Science, Mathematics

Prep Time: < 10 minutes

Activity Duration: One class period

Materials Category: Special requirements

| National Education Standards | | | | |
|------------------------------|-------------|------------|------|-----------|
| Science | Mathematics | Technology | | Geography |
| | | ISTE | ITEA | |
| 2a, 5a | 2a | | | |

Objective: To experiment and see how gravity works, and to compare addition and subtraction.

Materials:

- One 1-gallon milk container
- 30 marbles
- Rubber band
- 30 counters
- Scissors

Related Links:

None



Gravity At Work

Teacher Sheets

Pre-lesson Instruction

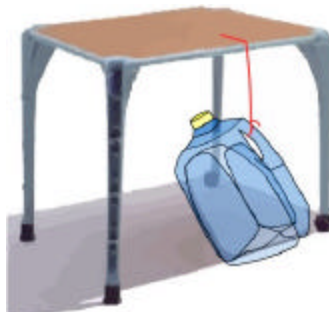
Cut rubber bands, and attach one securely to the handle of each milk container.

Background

Discuss the concept of gravity. Explain that on Earth, gravity is the force that keeps us on the ground. In space, things float because there is not enough gravity to pull them down. The students will also see how addition and subtraction compare by adding and subtracting the marbles from the milk container. They use the experiment to see how gravity works and to interpret it with the addition and subtraction of the marbles. This lesson is done in a group of two or three students.

Guidelines

1. Read the K-4 NASAexplores article, "Microgravity: Always A Bad Hair Day," and discuss it.
2. Discuss that the measure of the force of the gravitational pull on an object is the object's weight. There is not as much gravity on the Moon, so objects on the Moon will weigh less than here on Earth.
3. Distribute materials and explain that they will do an experiment to show gravity at work.
4. Have groups place about one-half of the free end of the rubber band on a desk so that the container dangles over the side.
5. Ask one child to place his/her hands flat on the rubber band to support the container.
6. Have students place marbles in the container in groups of five. Explain that gravity pulls the container toward Earth, making the rubber band stretch. Tell students that as the milk container becomes heavier, the stretch of the rubber band is a measure of the gravitational force.
7. Now, let groups choose a different child to press on the rubber band, and have students explore subtraction by taking groups of five marbles out of the container. Continue until the container is empty.
8. Students can use their counters to show how many marbles are left in the container by beginning with 30 counters and removing five counters each time five marbles are taken out of the container.



Discussion / Wrap-up

- Discuss what happens to the container and rubber band as marbles are added to the milk container. Tell the students that as more mass is added to the container, the gravitational pull increases. That is defined as weight. The more mass an object has, the more it weighs on Earth.
- Discuss what happens to the container and rubber band as marbles are removed. Tell students that the mass has been lessened, therefore, the weight is less. The gravitational pull has decreased.
- Answer to question 5: When all 30 marbles were added to the milk container.
- Answer to question 6: When there were fewer or no marbles in the milk container.

Extensions

- For more advanced students, the teacher may want to explain that the mass of an object is the same no matter what planet you may be on. But, the weight will be different due to the gravitational force.



Gravity At Work

Student Sheet

1. If 3 groups of 5 marbles are placed in the milk container, how many marbles do you have in all? _____

What happens to the rubber band when the marbles are added?

2. If 4 groups of 5 marbles are placed in the milk container, how many marbles do you have in all? _____

What happens to the rubber band when the marbles are added?

3. After all the marbles are in and 2 groups of 5 marbles are taken out of the milk container, how many marbles are left inside?

What happens to the rubber band when the marbles are taken out?

4. If 4 groups of 5 marbles are taken out of the milk container, how many marbles are left inside? _____

What happens to the rubber band when the marbles are taken out?

5. When was the milk container most affected by the gravitational pull?
-
-

6. When was the milk container least affected by the gravitational pull?
-
-

